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INTEGRATION IN THE LIVESTOCK INDUSTRY

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The increasingly rapid pace of technological advance in recent decades has stepped up the adjustments required on farms and in the market places. One important type of adjustment, aimed at better coordinating the functions of farms and of industries related to agriculture, has come to be called vertical integration or contract farming. Vertical integration in farming is usually considered to be the sharing by farmers of some managerial decisions and risks involved in production and marketing with one or more related businesses, such as the supplier, processor, or distributor. Some of these farmer-businessman arrangements may be connections which are only slightly more binding than the conventional market relationships. Others may involve the complete ownership and operation of the farm by the related business activity. Vertical integration in agriculture usually lies somewhere between these limits.

Vertical integration is not new in agriculture. For generations, some processors of canning crops such as corn, peas, beans, tomatoes, and other commodities have attempted to reduce the risks of variation in supply by making contractual arrangements with nearby farmers.

The most dramatic example in recent decades is vertical integration in broiler production. About 95 percent of the commercial broilers are produced on some type of integrated basis. In most areas the feed dealer is a major integrator. Processing plants also have done some contracting with broiler producers. In these arrangements, the contractor usually furnishes chicks, feed, medicine, vaccine, fuel, and litter while the grower usually furnishes the broiler house, equipment, and labor to raise the flock. Title to the chickens ordinarily remains with the contracting firm. The contractor customarily pays the grower a flat amount per bird or per pound sold. Some contracts call for sharing of the profits (if any) or provide for bonuses for efficient feed conversion.

In integrating the production and marketing of fruits and vegetables, marketing firms and producers use a great variety of schemes. Cooperatives are often involved. Integrators may specify dates of planting, varieties, and cultural and spraying practices. They sometimes provide fertilizers, insecticides, and spraying services and skilled labor crews to harvest and pack the crop to reduce the danger of damage and decay.

Advancing technology has provided pressures for increasing the size of the farm business, for acquiring more capital, for greater managerial ability, and for obtaining technical assistance in management. It has also brought about more standardization of our agricultural products, more rigid costs structures, and -- some would say -- the tendency for production to outrun supply, and encouragement of excess production when prices are low. Vertical integration, in turn, has hastened the adoption of technological innovations and has often been the stimulant for their development.

1/ Prepared by Gerald Engelman, Market. Res. Div., Agr. Market. Serv.

Recent Developments in the Livestock Industry

Although integration is not new in agriculture, it is new for most livestock farmers. Livestock producers have generally prided themselves on their independence. Most of them have had production loans for the feeding of cattle or for the building up of livestock herds, but this was usually thought to be a temporary device which was to be abandoned as soon as they achieved their financial independence and could make management decisions without restraints.

Beef Cattle

The most significant development in cattle feeding since World War II has been the growth of the large commercialized feedlots, sometimes called beef factories, which may feed from 1,000 to 30,000 or more head of cattle annually. These feedlots are in continuous operation. In the larger feedlots some cattle are moved in and others are moved out every week of the year. About one-third of the fed cattle in the country come from feedlots in the 11 Western States. Probably more than 90 percent of these are from commercial feedlots feeding more than 100 head.

The rapid expansion of population and the growing preferences for fed beef in the West, particularly in the Pacific Coast States, provided the triggering mechanism for this western development. Farmer-feeders in the West were not able to increase their production of beef cattle of the desired quality enough to meet the new demand. Surplus feeds raised on an individual farm were too limited for production of adequate numbers of highly finished beef. An operator of a large feedlot, however, is capable of mobilizing the feed resources of a large area. This perhaps has been the chief reason for the development of commercial feedlots in the West. This also may explain why this development has not spread rapidly in the Corn Belt where farms generally raise their own supply of grain concentrates and roughages.

In the early western feedlots many crop residues, such as dried sugar-beet pulp, almond meal, dried prunes, orange pulp, cotton hulls, cottonseed meal, and miscellaneous fruit and vegetable byproducts were fed to the cattle. With the continued growth of commercial feeding, it has become necessary for many, if not most, of the feedlots to adopt a complete formula ration containing grain concentrate, supplement, and roughage, generally mixed and ground on the premises of the commercial feedlot. Nevertheless, it does not appear that the grains fed, mainly barley and grain sorghums, are usually those available within the western region. Relatively small quantities of corn have been shipped from the Middle West to the west coast, though shipments to commercial feedlots in Colorado are larger.

The large commercial feedlot development in the West is not typical of vertical integration or contract farming in other agricultural enterprises. Nevertheless, it has made integrated or contract arrangements easier. These arrangements take the form of custom (contract) feeding. Since vertical integration may be either forward by ranchers maintaining ownership through the feeding period or backward by packers and chain stores assuming production functions, arrangements vary considerably. Some contracts are written; others are only verbal. Rates paid feedlot operators often include a daily per head handling charge, the actual cost of ingredient feeds, and perhaps an allowance for costs of milling feeds.

Probably less than half the cattle fed in western commercial feedlots are fed under custom arrangements. Packers, however, have been feeding some cattle for several decades. Several chain store companies entered the cattle feeding business during World War II when meat supplies were scarce. Custom feeding arrangements appear to be well suited to both packers and chain store companies. Nevertheless, packer and chain store custom feeding still appears to be an extremely small part of the total supply of fed cattle killed in the United States during any given year. Some chain stores have already dropped out of the beef feeding business. Packers, like many farmers, appear to be "in and outers" depending on profit prospects in feeding. Narrow operating margins in dressed beef slaughtering would appear to preclude any extensive risk bearing by packers in feeding enterprises.

Although both the commercial feedlots, or "beef factories," and the custom feeding arrangements appear to be more characteristic of the West than of the Corn Belt, some large commercial feedlots are located in the Missouri River area. Some contract feeding of cattle is carried on in the Corn Belt. Most of these contracts, however, appear to be production credit arrangements for feeding commercial protein supplements manufactured by particular firms.

Hogs

Potential integration in the swine industry has stimulated most attention given to integration during the last year. Some people have predicted that the swine industry will follow the pattern of the broiler industry in moving to the South and East. Some have estimated the South will be self-sufficient in pork production in a few years and eventually might account for the major portion of the Nation's pork production.

Accurate estimates of the number of hogs raised under some form of contract are not now available, but the "informed guesses" range from 2 to 5 percent. A much more significant development since World War II has been the increasing number of large-scale specialized hog producers who sell 500 to 1,000 or more hogs per year. Unfortunately, adequate statistics are not available to measure the importance of this development in terms of total hog production. Available data indicate that in 1940 about 2 percent of the farms having hogs had 20 or more spring farrowings. ^{2/} By the spring of 1954, about 7 percent reported 20 or more farrowings. This comparison, however, masks the importance of the farms with 50 or more sows farrowing twice a year.

Two general types of contracts have been offered to farmers during the last year -- the feeder-pig contract, which resembles the broiler contract, and the sow-and-pig contract. In the feeder-pig contract the integrator, who is often a feed dealer, supplies the pigs, the feed, specialized management, veterinary expenses, and takes the hogs when they are ready for market. This type

^{2/} "Selected Data on Size of Hog Operations on Farms in the United States", The Livestock and Meat Situation, by Victor B. Phillips and Raymond O. Gaarder, Agr. Market. Serv., Sept. 1958.

of contract has been offered in the South and in the Middle Atlantic States. The sow-and-pig contract provides for leasing bred sows to farmers. These contracts vary greatly in the amount of management control exercised by the integrators. Sometimes special strains of meat-type hogs are supplied. Some contracts require growers to adopt the multiple farrowing system and to use the feed company's feed supplements, housing, and equipment as specified, though the farmer makes his own arrangements for production credit. One feed company has a sow-and-pig contract that provides for a 50-cent per 100 pounds bonus for number-1 hogs. The number-2 and -3 hogs are sold at the local market price.

Factors Encouraging Integration

One factor which might tend to encourage vertical integration in the livestock industry is the role of specialized management in the production process. Advances in research on the production side have made livestock production more of a science and less of an art. Nutrition research has developed separate specialized swine rations for gilts during the pregestation, breeding, gestation, and farrowing periods, for the little pigs during four separate periods within the lactation period, and for two separate periods during growing and finishing. Obviously, if such a system is to be adopted, planning becomes a critical management function which lends itself quite well to centralization and specialization.

Another factor is the gearing of the production process so that a specific form and quality can be supplied according to a predetermined time schedule. This has resulted from specification buying. Most chain stores probably would like to have about the same quality and quantity of beef every week during the year except when they offer beef as a weekend special. However, most calves still are born in the spring and most cattle still are marketed in the fall. Seasonality of production tends to complicate integration problems.

The problem of seasonal production is even more acute in pork. Here it is associated with wider processing margins during the period of ample supplies and extremely narrow margins during periods of scarce supply. Meatpackers attempt to even out the flow of pork products by their storage operations. The readiness of many packers to relinquish this responsibility accounts for the great interest among packers in multiple farrowing schemes for hogs, even though these are only gradually being adopted by farmers.

Other factors contributing to integration in livestock production are the forces which tend to move feed grains off farms where they were raised. Price supports which involve the sealing and eventual removal of feed grains from farms may be such a factor. When feed grains are accumulated off the farms in the hands of feed manufacturers or dealers, the production of complete formula feeds is encouraged and the manufacturers or dealers begin seeking means of insuring sales of their products. Thus, integration is encouraged.

The growing commercialization of agriculture, the higher working capital required, and the drive toward larger farms also tend to promote the integration in the livestock industry. As agriculture becomes more commercialized farmers on diversified farms face an increasing need for operating capital. In addition, farm land sells at such high prices that considerable investment capital is required of beginning farmers and those attempting to increase the size of their farms. These factors cause farmers, particularly new or diversified farmers, to seek means of acquiring capital in order to specialize or enlarge the size of their farms. One way of doing this is through integration which also helps the farmer shift some of the risk to marketing firms. The leasing of farms is another means of increasing farm size with limited capital, but leasing arrangements are more simply and more conveniently managed on a feed grain production basis than when livestock are involved. Consequently, in seeking capital, farmers interested in livestock are more likely to consider integrating arrangements than leasing additional land.

To examine the possible advantages of integration in cattle production and to see where integration achieves its greatest economies, it seems appropriate to divide the production and marketing phases into several steps or groups. Cattle feeding may be divided into three phases -- the procurement of feeder cattle, the feeding or fattening of cattle, and finally marketing. On the procurement side, the large-scale buyer can learn much more about the availability of particular kinds of cattle in various areas and communities than can the diversified farmer-feeder. There appears to be a trend toward contracting sales of feeder calves, particularly those from the so-called reputation herds. Before some of these calves are born they have been contracted for delivery at a certain date in the fall.

During the feeding period, the critical problem seems to be the relative efficiency of feed conversion and labor inputs. Although little is known about the relative efficiency of feed conversion, it does appear that farmer-feeders in the Corn Belt have adopted advances in nutrition about as rapidly as they are made available. Labor-saving equipment and the efficient management of labor inputs have had a place in making the larger commercial feedlot possible and profitable. These feedlots have been able to compete with Corn Belt feeders who do not make a very high charge for their own labor inputs in feeding cattle.

On the marketing side, the large operator probably has some additional advantages. He is likely to be more skilled at judging when his cattle are ready for sale. The increased importance of specification buying and the increased reliance on Government grades has made this all important. The 600-pound Choice carcasses may be desired in great quantities nearly every week. The large-scale operator who buys and sells regularly can more easily tell just when his cattle have reached desired grade and weight than the small operator. Large-scale, integrated operators usually deal directly with the packer, often on a grade and yield basis, instead of the established markets, terminals, and auctions. These opportunities are not as available to the smaller producer, who may deal with a packer once or twice a year and have less confidence in his own ability to bargain with the packers.

Outlook for Integration

In discussing the potentialities for swine integration, it is worthwhile to attempt some parallels between swine production and broiler production. The process of gestation, birth, and raising of a pig to weaning age is more complicated than hatching a baby chick. First, it takes considerably longer than 21 days required for chickens to hatch. Also the farmer has a much greater investment in a newborn pig than in a newly hatched chick and he has an even greater relative investment in the pig when it is weaned. The first 6 to 8 weeks of a pig's life, the lactation period, is a period of numerous stresses. In terms of individual care required, pigs are more comparable at weaning age to baby chicks than at any other age. It requires a good deal more individual care by a skilled husbandman to bring little pigs through the gestation and lactation periods up to the age when they can be handled in a rather large-scale unit. The process does not lend itself nearly as well to standardized practices prescribed by contractual arrangements.

Pig hatcheries were tried about 10 years ago in Iowa, Wisconsin, and Minnesota but various diseases and parasites limited the development. Some scientific "break throughs" are still needed. But if pig hatcheries ever become truly successful, they will unquestionably provide a tremendous boost to swine integration. The supply of feeder pigs is an important limiting factor to the development of the feeder-pig contract. Integrators who hope to move into this area will probably have to develop a supply of their own.

Another factor which might encourage integration is the need for the development of the meat-type hog. With an integration program, blood lines and management practices might be more effectively controlled, thereby yielding a higher proportion of grade-1 hogs.

Genetic standardization might be more difficult to achieve for hogs than for poultry. Only a relatively small proportion of the swine breeding stock of this country is tested as to its meat-type performance. Perhaps at a later date a substantial portion will be tested. Nevertheless, the higher progeny rate per bird in poultry has permitted much more rapid progress towards genetic standardization than is likely to happen in hogs.

In most of the sow-and-pig contracts in the Corn Belt the feed manufacturer supplies only the protein supplement feed and the farmer feeds his own corn. Price guarantees usually are not included in these contracts. One problem in developing more meat-type hogs from this kind of contract is that of insulating the farmer from the wide cyclical variations in corn-hog price ratios.

Effects of increased integration on shifts in the location of hog production cannot be accurately forecast. Present indications suggest that these shifts will not be as dramatic as those in the broiler industry. There is reason to believe that hog production will not simply seek out the area of lowest cost labor as the broiler industry did. Before World War II, the poultry industry on many Midwest farms was simply a side line enterprise, whereas the swine industry was and is a major enterprise.

Diversification in farming still has some advantages over specialization. Since the income of a diversified farm operator is affected less by price and production changes in a single enterprise, he is better able to weather an

unfavorable year for that enterprise than a specialized operator. In addition, his out-of-pocket costs usually are lower.

Another factor to be considered is that broilers appear to be about twice as efficient as either hogs or beef cattle in converting feed to pounds of protein. The higher progeny rate in poultry has enabled the broiler industry to make greater progress in breeding for efficiency of feed conversion. The net effect is that feed will travel to broilers more readily and farther than to pigs or beef cattle.

Another limiting factor to locational shifts in swine production is the fact that the demand for pork appears to be inelastic. This means that large changes in pork prices result in relatively little change in consumption. Moreover, for the last decade or so the demand for pork has been declining. Thus, consumers today would buy less pork than previously even if relative prices of pork had remained unchanged. Integrated broiler production, on the other hand, has been essentially a new industry wherever it has appeared in the South and North Atlantic States. Rapidly expanding technology permits the production of more broilers at lower costs per pound. One result is that the average per capita consumption of poultry meat expanded from about 15 pounds per capita in the 1930's to about 30 pounds in recent years. The broiler industry has accounted for most of this increase. Turkey consumption has also increased but the consumption of stewing hens and other chickens has decreased. There is little likelihood that pork consumption could be expanded by more than a small percentage of the rather dramatic growth in poultry consumption.

This does not mean that hog production will not increase in the South and in other areas outside the Corn Belt. But the expansion that does take place will be limited by the potential availability of feed grains. Swine production as a major enterprise will not move from the Midwest to the South and East as readily nor as completely as did broiler production. Moreover, corn is less likely to be shipped from Iowa to Georgia to raise pork to ship back to Iowa chain stores, as is being done in the case of broilers.

Nevertheless, more integration in livestock production can be expected. This seems to be the inevitable aftermath of technological progress and technological advances that are certain to come. Integration contracts will definitely appeal to the beginning farmer lacking adequate financial reserves. Expanded hog production can also be expected outside the Corn Belt through integration, but this growth will be based largely on the feed production potential in the South. It appears doubtful, however, that livestock integration will move either as fast or as far as broiler integration. Nor does it appear that the location of livestock production will shift as dramatically.

The commercial feedlot development in the West seems to be rather firmly situated. It survived drastic cyclical price declines in 1954. It may be expected to expand with the growth in population in the west coast States. The amount of custom feeding, especially by chain stores and meat packers, probably will fluctuate considerably from year to year. Commercial feedlots are not expected to supplant farmer-feeders in the Corn Belt during the next decade or so. Nevertheless, some growth in the proportion of cattle fed in large feedlots is not unlikely.